Luminita Stevens
Department of Economics
University of Maryland

Topics in Behavioral Macroeconomics
ECON 702 Syllabus
Fall 20022

Course Information

Lectures: Tu,Th 2 - 3:15 pm, 3100 Tydings Hall

Office hours: By appointment, in person or on Zoom

UMD's policies on graduate courses and graduate student rights and responsibilities can be found here: Course Related Policies | The University of Maryland Graduate School

Description

ECON 702 is part of the Economics Department's two-semester sequence in Advanced Macroeconomics, intended for second-year Ph.D. students. This course will focus on selected developments in the fast-growing area of behavioral macroeconomics, with applications to business cycles and monetary economics. We will discuss surveys and controlled laboratory experiments that test the full information rational expectations (FIRE) hypothesis and characterize deviations from FIRE in individual beliefs and actions, and we will study models that relax the FI and RE assumptions, and discuss how the resulting biases and constraints on individual choice affect aggregate outcomes.

Prerequisites

ECON 601 and ECON 602. Students who have not taken these courses and students from other departments or years should talk to me to enroll in or audit this course.

Topics

1. Preamble: Rational expectations foundations

2. Testing REE: Surveys and RCTs
3. Fixed information frictions: sticky and noisy information models
4. Endogenizing information frictions: rational inattention models
5. Lab experiments: perceptual noise, stochastic choice, probability & belief distortions
6. Cognitive constraints and risk preferences
7. Present bias
8. Adaptive expectations and learning models of bounded rationality
9. Diagnostic expectations and over-extrapolation
10. Level-k in macro models
11. Cognitive noise and strategic considerations
12. Finite horizons
13. Aggregation: news, sentiments, uncertainty shocks
14. Some welfare considerations

Grading (see ELMS for details)

50% = Research project on any of the main topics

30% = Referee report & recorded discussion on a paper from any of the main topics

15% = Written comments on 8 papers from any of the main topics

5% = In-class discussions on the topics posted on ELMS

Practical Books

Adler, Mortimer J & Charles Van Doren (2014), *How to read a book: The classic guide to intelligent reading*, Simon and Schuster.

Belcher, Wendy Laura (2019), *Writing your journal article in twelve weeks: A guide to academic publishing success*, University of Chicago Press.

Booth, Wayne C, Gregory G Colomb & Joseph M Williams (2008), *The craft of research*, University of Chicago Press.

Goodson, Patricia (2016), *Becoming an academic writer: 50 exercises for paced, productive, and powerful writing*, Sage Publications.

Reading List

Readings marked with ⛒ should not be used for comments or referee reports.

Some Background on Rational Expectations & Its Limits

⛒ Friedman, Milton (1953), "The methodology of positive economics," in *Essays in Positive Economics*, pp. 3–43, University of Chicago Press.

⛒ Lucas, Robert E (1976), "Econometric policy evaluation: A critique," *Carnegie-Rochester Conference Series on Public Policy* 1: 19–46.

⛒ Lucas, Robert E & Thomas J Sargent (1981), *Rational expectations and econometric practice*, vol. 2, University of Minnesota Press.

⛒ Muth, John F (1961), "Rational expectations and the theory of price movements," *Econometrica* pp. 315–335.

⛒ Pesaran, M Hashem (1987), *The Limits to Rational Expectations*, Blackwell.

⛒ Rabin, Matthew (2013), "Incorporating limited rationality into economics," *Journal of Economic Literature* 51(2): 528–43.

⛒ Simon, Herbert A (1955), "A behavioral model of rational choice," *The Quarterly Journal of Economics* 69(1): 99–118.

⛒ Sims, Christopher A (1980), "Macroeconomics and reality," *Econometrica* pp. 1–48.

Testing REE: Direct Survey Evidence

⛒ Carroll, Christopher D (2003), "Macroeconomic expectations of households and professional forecasters," *The Quarterly Journal of economics* 118(1): 269–298.

⛒ Coibion, Olivier & Yuriy Gorodnichenko (2012), "What can survey forecasts tell us about information rigidities?" *Journal of Political Economy* 120(1): 116–159.

⛒ Coibion, Olivier & Yuriy Gorodnichenko (2015), "Information rigidity and the expectations formation process: A simple framework and new facts," *American Economic Review* 105(8): 2644–78.

⛒ Greenwood, Robin & Andrei Shleifer (2014), "Expectations of returns and expected returns," *The Review of Financial Studies* 27(3): 714–746.

⛒ Malmendier, Ulrike & Stefan Nagel (2016), "Learning from inflation experiences," *The Quarterly Journal of Economics* 131(1): 53–87.

⛒ Mankiw, N Gregory, Ricardo Reis & Justin Wolfers (2003), "Disagreement about inflation expectations," *NBER Macroeconomics Annual* 18: 209–248.

⛒ Manski, Charles F (2004), "Measuring expectations," *Econometrica* 72(5): 1329–1376.

Testing REE: Surveys with Information Treatments

⟐ Cavallo, Alberto, Guillermo Cruces & Ricardo Perez-Truglia (2017), "Inflation expectations, learning, and supermarket prices: Evidence from survey experiments," *American Economic Journal: Macroeconomics* 9(3): 1–35.

⟐ Coibion, Olivier, Yuriy Gorodnichenko & Saten Kumar (2018), "How do firms form their expectations? New survey evidence," *American Economic Review* 108(9): 2671–2713.

Andre, Peter, Carlo Pizzinelli, Christopher Roth & Johannes Wohlfart (2021), "Subjective Models of the Macroeconomy: Evidence From Experts and Representative Samples," University of Bonn and University of Cologne, Germany.

Armantier, Olivier, Scott Nelson, Giorgio Topa, Wilbert Van der Klaauw & Basit Zafar (2016), "The price is right: Updating inflation expectations in a randomized price information experiment," *Review of Economics and Statistics* 98(3): 503–523.

Armona, Luis, Andreas Fuster & Basit Zafar (2019), "Home price expectations and behaviour: Evidence from a randomized information experiment," *The Review of Economic Studies* 86(4): 1371–1410.

Coibion, Olivier, Yuriy Gorodnichenko & Tiziano Ropele (2020), "Inflation expectations and firm decisions: New causal evidence," *The Quarterly Journal of Economics* 135(1): 165–219.

Coibion, Olivier, Yuriy Gorodnichenko & Michael Weber (2022), "Monetary policy communications and their effects on household inflation expectations," *Journal of Political Economy* p. forthcoming.

Joint Behavior of Expectations & Choice Data

D'Acunto, Francesco, Ulrike Malmendier, Juan Ospina & Michael Weber (2021), "Exposure to grocery prices and inflation expectations," *Journal of Political Economy* 129(5): 1615–1639.

Das, Sreyoshi, Camelia M Kuhnen & Stefan Nagel (2020), "Socioeconomic status and macroeconomic expectations," *The Review of Financial Studies* 33(1): 395–432.

Gennaioli, Nicola, Yueran Ma & Andrei Shleifer (2016), "Expectations and investment," *NBER Macroeconomics Annual* 30(1): 379–431.

Giglio, Stefano, Matteo Maggiori, Johannes Stroebel & Stephen Utkus (2021), "Five facts about beliefs and portfolios," *American Economic Review* 111(5): 1481–1522.

Kuchler, Theresa & Basit Zafar (2019), "Personal experiences and expectations about aggregate outcomes," *The Journal of Finance* 74(5): 2491–2542.

Roth, Christopher & Johannes Wohlfart (2020), "How do expectations about the macroeconomy affect personal expectations and behavior?" *Review of Economics and Statistics* 102(4): 731–748.

Modeling Sticky Information

⛈ Mankiw, N. Gregory & Ricardo Reis (2002), "Sticky information versus sticky prices: A proposal to replace the New Keynesian Phillips Curve," *The Quarterly Journal of Economics* 117(4): 1295–1328.

⛈ Reis, Ricardo (2006), "Inattentive producers," *The Review of Economic Studies* 73(3): 793–821.

Auclert, Adrien, Matthew Rognlie & Ludwig Straub (2020), "Micro jumps, macro humps: Monetary policy and business cycles in an estimated HANK model," National Bureau of Economic Research Working Paper w26647.

Carroll, Christopher D, Edmund Crawley, Jiri Slacalek, Kiichi Tokuoka & Matthew N White (2020), "Sticky expectations and consumption dynamics," *American Economic Journal: Macroeconomics* 12(3): 40–76.

Models with Noisy Information

⛈ Angeletos, George-Marios & Chen Lian (2016), "Incomplete information in macroeconomics: Accommodating frictions in coordination," in *Handbook of Macroeconomics*, John B. Taylor & Harald Uhlig, eds., vol. 2, pp. 1065–1240, Elsevier.

⛈ Morris, Stephen & Hyun Song Shin (2002), "Social value of public information," *American Economic Review* 92(5): 1521–1534.

⛈ Nimark, Kristoffer (2008), "Dynamic pricing and imperfect common knowledge," *Journal of Monetary Economics* 55(2): 365–382.

⛈ Woodford, Michael (2003), "Imperfect common knowledge and the effects of monetary policy," in *Knowledge, Information, and Expectations in Modern Macroeconomics: In Honor of Edmund S. Phelps*, Joseph Sticglitz Philippe Aghion, Roman Frydman & Michael Woodford, eds., pp. 25–58, Princeton University Press.

Angeletos, George-Marios & Jennifer La'O (2010), "Noisy business cycles," *NBER Macroeconomics Annual* 24(1): 319–378.

Melosi, Leonardo (2014), "Estimating models with dispersed information," *American Economic Journal: Macroeconomics* 6(1): 1–31.

Nimark, Kristoffer (2017), "Dynamic higher order expectations," *CEPR Discussion Paper No. DP11863* .

Rational Inattention I - Noisy and Discrete Choice

⛈ Caplin, Andrew & Mark Dean (2015), "Revealed preference, rational inattention, and costly information acquisition," *American Economic Review* 105(7): 2183–2203.

⛈ Caplin, Andrew, Mark Dean & John Leahy (2019), "Rational inattention, optimal consideration sets, and stochastic choice," *The Review of Economic Studies* 86(3): 1061–1094.

⛈ Cover, Thomas M & Joy A Thomas (2006), *Elements of information theory 2nd Edition*, Wiley-Interscience, chapters 2,8,10 in particular.

⛈ Matějka, Filip (2016), "Rationally inattentive seller: Sales and discrete pricing," *The Review of Economic Studies* 83(3): 1125–1155.

⛈ Matějka, Filip & Alisdair McKay (2015), "Rational inattention to discrete choices: A new foundation for the multinomial logit model," *American Economic Review* 105(1): 272–98.

⛈ Sims, Christopher A (2003), "Implications of rational inattention," *Journal of Monetary Economics* 50(3): 665–690.

Gabaix, Xavier (2014), "A sparsity-based model of bounded rationality," *The Quarterly Journal of Economics* 129(4): 1661–1710.

Kőszegi, Botond & Filip Matějka (2020), "Choice simplification: A theory of mental budgeting and naive diversification," *The Quarterly Journal of Economics* 135(2): 1153–1207.

Miao, Jianjun, Jieran Wu & Eric R Young (2022), "Multivariate rational inattention," *Econometrica* 90(2): 907–945.

Nimark, Kristoffer P & Savitar Sundaresan (2019), "Inattention and belief polarization," *Journal of Economic Theory* 180: 203–228.

Rational Inattention II - Strategic Considerations

⛈ Hellwig, Christian & Laura Veldkamp (2009), "Knowing what others know: Coordination motives in information acquisition," *The Review of Economic Studies* 76(1): 223–251.

Matějka, Filip (2015), "Rigid pricing and rationally inattentive consumer," *Journal of Economic Theory* 158: 656–678.

Ravid, Doron (2020), "Ultimatum bargaining with rational inattention," *American Economic Review* 110(9): 2948–63.

Yang, Ming (2015), "Coordination with flexible information acquisition," *Journal of Economic Theory* 158: 721–738.

Rational Inattention III - Sluggish and Discrete Adjustment

⛈ Khaw, Mel Win, Luminita Stevens & Michael Woodford (2017), "Discrete adjustment to a changing environment: Experimental evidence," *Journal of Monetary Economics* 91: 88–103.

⛈ Maćkowiak, Bartosz, Filip Matějka & Mirko Wiederholt (2018), "Dynamic rational inattention: Analytical results," *Journal of Economic Theory* 176: 650–692.

⛈ Maćkowiak, Bartosz & Mirko Wiederholt (2009), "Optimal sticky prices under rational inattention," *American Economic Review* 99(3): 769–803.

⛈ Sims, Christopher A (1998), "Stickiness," in *Carnegie-Rochester Conference Series on Public Policy*, vol. 49, pp. 317–356.

⛈ Sims, Christopher A (2010), "Rational inattention and monetary economics," in *Handbook of Monetary Economics*, vol. 3, pp. 155–181, Elsevier.

⛈ Steiner, Jakub, Colin Stewart & Filip Matějka (2017), "Rational inattention dynamics: Inertia and delay in decision-making," *Econometrica* 85(2): 521–553.

⛈ Stevens, Luminita (2020), "Coarse pricing policies," *The Review of Economic Studies* 87(1): 420–453.

⛈ Woodford, Michael (2009), "Information-constrained state-dependent pricing," *Journal of Monetary Economics* 56: S100–S124.

Rational Inattention IV - Macro Applications

Acharya, Sushant & Shu Lin Wee (2020), "Rational inattention in hiring decisions," *American Economic Journal: Macroeconomics* 12(1): 1–40.

Afrouzi, Hassan (2020), "Strategic inattention, inflation dynamics, and the non-neutrality of money," CESifo working paper.

Afrouzi, Hassan & Choongryul Yang (2021), "Dynamic rational inattention and the Phillips curve," SSRN 3770462.

Luo, Yulei (2008), "Consumption dynamics under information processing constraints," *Review of Economic dynamics* 11(2): 366–385.

Luo, Yulei & Eric R Young (2010), "Risk-sensitive consumption and savings under rational inattention," *American Economic Journal: Macroeconomics* 2(4): 281–325.

Maćkowiak, Bartosz & Mirko Wiederholt (2015), "Business cycle dynamics under rational inattention," *The Review of Economic Studies* 82(4): 1502–1532.

Maćkowiak, Bartosz & Mirko Wiederholt (2021), "Rational Inattention and the Business Cycle Effects of Productivity and News Shocks," CEPR Discussion Paper No. DP16812.

Morales-Jimenez, Camilo & Luminita Stevens (2022), "Nominal rigidities in U.S. business cycles," Working paper, University of Maryland.

Paciello, Luigi & Mirko Wiederholt (2014), "Exogenous information, endogenous information, and optimal monetary policy," *Review of Economic Studies* 81(1): 356–388.

Some Evidence from The Lab: Stochasticity & Bias

⟐ Benjamin, Daniel J (2019), "Errors in probabilistic reasoning and judgment biases," *Handbook of Behavioral Economics: Applications and Foundations 1* 2: 69–186.

⟐ Khaw, Mel Win, Luminita Stevens & Michael Woodford (2017), "Discrete adjustment to a changing environment: Experimental evidence," *Journal of Monetary Economics* 91: 88–103.

⟐ Khaw, Mel Win, Luminita Stevens & Michael Woodford (2021), "Individual differences in the perception of probability," *PLoS Computational Biology* 17(4): e1008871.

⟐ Petzschner, Frederike H, Stefan Glasauer & Klaas E Stephan (2015), "A Bayesian perspective on magnitude estimation," *Trends in Cognitive Sciences* 19(5): 285–293.

⟐ Schotter, Andrew & Isabel Trevino (2014), "Belief elicitation in the laboratory," *Annual Review of Economics* 6(1): 103–128.

⟐ Woodford, Michael (2012), "Inattentive valuation and reference-dependent choice," Working paper.

⟐ Woodford, Michael (2020), "Modeling imprecision in perception, valuation, and choice," *Annual Review of Economics* 12: 579–601.

Armantier, Olivier, Wändi Bruine de Bruin, Giorgio Topa, Wilbert Van Der Klaauw & Basit Zafar (2015), "Inflation expectations and behavior: Do survey respondents act on their beliefs?" *International Economic Review* 56(2): 505–536.

Dean, Mark & Nate Leigh Neligh (2022), "Experimental tests of rational inattention," Working paper.

Fuster, Andreas, Ricardo Perez-Truglia, Mirko Wiederholt & Basit Zafar (2020), "Expectations with endogenous information acquisition: An experimental investigation," *The Review of Economics and Statistics* pp. 1–54.

Landier, Augustin, Yueran Ma & David Thesmar (2019), "Biases in expectations: Experimental evidence," *Available at SSRN 3046955* .

Cognitive Constraints and Risk Preferences

⟐ Calvet, Laurent E, John Y Campbell, Francisco Gomes & Paolo Sodini (2021), "The cross-section of household preferences," National Bureau of Economic Research Working Paper w28788.

⟐ Kahneman, Daniel & Amos Tversky (1979), "Prospect Theory: An Analysis of Decision under Risk," *Econometrica* 47(2): 263–292.

⟐ Khaw, Mel Win, Ziang Li & Michael Woodford (2021), "Cognitive imprecision and small-stakes risk aversion," *The Review of Economic Studies* 88(4): 1979–2013.

⟐ Malmendier, Ulrike & Stefan Nagel (2011), "Depression babies: do macroeconomic experiences affect risk taking?" *The Quarterly Journal of Economics* 126(1): 373–416.

Cohn, Alain, Jan Engelmann, Ernst Fehr & Michel André Maréchal (2015), "Evidence for countercyclical risk aversion: An experiment with financial professionals," *American Economic Review* 105(2): 860–85.

Deck, Cary & Salar Jahedi (2015), "The effect of cognitive load on economic decision making: A survey and new experiments," *European Economic Review* 78: 97–119.

Enke, Benjamin & Thomas Graeber (2019), "Cognitive uncertainty," Working paper.

Frydman, Cary & Lawrence J Jin (2022), "Efficient coding and risky choice," *The Quarterly Journal of Economics* 137(1): 161–213.

Gerhardt, Holger, Guido P Biele, Hauke R Heekeren & Harald Uhlig (2016), "Cognitive load increases risk aversion," SFB 649 Discussion Paper.

Inter-temporal considerations: Present Bias

⟐ Angeletos, George-Marios, David Laibson, Andrea Repetto, Jeremy Tobacman & Stephen Weinberg (2001), "The hyperbolic consumption model: Calibration, simulation, and empirical evaluation," *Journal of Economic Perspectives* 15(3): 47–68.

⟐ Gabaix, Xavier & David Laibson (2022), "Myopia and discounting," Working paper.

⟐ Laibson, David (1997), "Golden eggs and hyperbolic discounting," *The Quarterly Journal of Economics* 112(2): 443–478.

⟐ Loewenstein, George, Ted O'Donoghue & Matthew Rabin (2003), "Projection bias in predicting future utility," *The Quarterly Journal of Economics* 118(4): 1209–1248.

Angeletos, George-Marios & Zhen Huo (2021), "Myopia and anchoring," *American Economic Review* 111(4): 1166–1200.

Epper, Thomas, Ernst Fehr, Helga Fehr-Duda, Claus Thustrup Kreiner, David Dreyer Lassen, Søren Leth-Petersen & Gregers Nytoft Rasmussen (2020), "Time discounting and wealth inequality," *American Economic Review* 110(4): 1177–1205.

Gabaix, Xavier (2020), "A behavioral New Keynesian model," *American Economic Review* 110(8): 2271–2327.

Laibson, David, Peter Maxted & Benjamin Moll (2021), "Present bias amplifies the household balance-sheet channels of macroeconomic policy," Working paper.

Adaptive Expectations and Learning

⟐ Branch, William A & George W Evans (2011), "Learning about risk and return: A simple model of bubbles and crashes," *American Economic Journal: Macroeconomics* 3(3): 159–91.

⟐ Evans, George W & Seppo Honkapohja (2001), *Learning and expectations in macroeconomics*, Princeton University Press, chapters 2,3,8,11,15.

⛈ Marimon, Ramon & Shyam Sunder (1993), "Indeterminacy of equilibria in a hyperinflationary world: Experimental evidence," *Econometrica* pp. 1073–1107.

⛈ Milani, Fabio (2007), "Expectations, learning and macroeconomic persistence," *Journal of Monetary Economics* 54(7): 2065–2082.

⛈ Timmermann, Allan G (1993), "How learning in financial markets generates excess volatility and predictability in stock prices," *The Quarterly Journal of Economics* 108(4): 1135–1145.

Adam, Klaus, Albert Marcet & Johannes Beutel (2017), "Stock price booms and expected capital gains," *American Economic Review* 107(8): 2352–2408.

Adam, Klaus, Albert Marcet & Juan Pablo Nicolini (2016), "Stock market volatility and learning," *The Journal of finance* 71(1): 33–82.

Carvalho, Carlos, Stefano Eusepi, Emanuel Moench & Bruce Preston (2021), "Anchored inflation expectations," Working Paper SSRN 3018198.

Cole, Stephen J & Fabio Milani (2021), "Heterogeneity in individual expectations, sentiment, and constant-gain learning," *Journal of Economic Behavior & Organization* 188: 627–650.

Eusepi, Stefano & Bruce Preston (2011), "Expectations, learning, and business cycle fluctuations," *American Economic Review* 101(6): 2844–72.

Gáti, Laura (2022), "Monetary policy & anchored expectations: an endogenous gain learning model," ECB Working Paper.

Marcet, Albert & Juan P Nicolini (2003), "Recurrent hyperinflations and learning," *American Economic Review* 93(5): 1476–1498.

Woodford, Michael (2013), "Macroeconomic analysis without the rational expectations hypothesis," *Annual Review of Economics* 5(1): 303–346.

Diagnostic Expectations and Over-extrapolation

⛈ Angeletos, George-Marios, Zhen Huo & Karthik A Sastry (2021), "Imperfect macroeconomic expectations: Evidence and theory," *NBER Macroeconomics Annual* 35(1): 1–86.

⛈ Bordalo, Pedro, Nicola Gennaioli, Yueran Ma & Andrei Shleifer (2020), "Overreaction in macroeconomic expectations," *The American Economic Review* 110(9): 2748–82.

⛈ Kahneman, Daniel & Amos Tversky (1972), "Subjective probability: A judgment of representativeness," *Cognitive Psychology* 3(3): 430–454.

Afrouzi, Hassan, Spencer Yongwook Kwon, Augustin Landier, Yueran Ma & David Thesmar (2020), "Overreaction in expectations: Evidence and theory," Available at SSRN.

Bianchi, Francesco, Cosmin L Ilut & Hikaru Saijo (2021), "Implications of diagnostic expectations: Theory and applications," Working paper.

Bordalo, Pedro, Nicola Gennaioli & Andrei Shleifer (2018), "Diagnostic expectations and credit cycles," *The Journal of Finance* 73(1): 199–227.

Kohlhas, Alexandre N & Ansgar Walther (2021), "Asymmetric attention," *American Economic Review* 111(9): 2879–2925.

Kucinskas, Simas & Florian S Peters (forthcoming), "Measuring under- and overreaction in expectation formation," *Review of Economics and Statistics* .

Macro Applications of Level-k

⟡ Farhi, Emmanuel & Iván Werning (2019), "Monetary policy, bounded rationality, and incomplete markets," *American Economic Review* 109(11): 3887–3928.

Coibion, Olivier, Yuriy Gorodnichenko, Saten Kumar & Jane Ryngaert (2021), "Do You Know that I Know that You Know...? Higher-Order Beliefs in Survey Data," *The Quarterly Journal of Economics* 136(3): 1387–1446.

García-Schmidt, Mariana & Michael Woodford (2019), "Are low interest rates deflationary? A paradox of perfect-foresight analysis," *American Economic Review* 109(1): 86–120.

Iovino, Luigi & Dmitriy Sergeyev (2022), "Central Bank balance sheet policies without rational expectations," Working paper.

Khaw, Mel Win, Luminita Stevens & Michael Woodford (2022), "Adjustment dynamics during a strategic estimation task," Working paper.

Vimercati, Riccardo Bianchi, Martin S Eichenbaum & Joao Guerreiro (2021), "Fiscal policy at the zero lower bound without rational expectations," Tech. rep., National Bureau of Economic Research.

Cognitive Limitations, Coordination, and Strategic Considerations

⟡ Angeletos, George-Marios & Jennifer La'O (2009), "Incomplete information, higher-order beliefs and price inertia," *Journal of Monetary Economics* 56: S19–S37.

⟡ Angeletos, George-Marios & Chen Lian (2022), "Dampening General Equilibrium: Incomplete Information and Bounded Rationality," NBER Working Paper w29776.

⟡ Fehr, Ernst & Jean-Robert Tyran (2008), "Limited rationality and strategic interaction: the impact of the strategic environment on nominal inertia," *Econometrica* 76(2): 353–394.

⟡ Haltiwanger, John & Michael Waldman (1985), "Rational expectations and the limits of rationality: An analysis of heterogeneity," *The American Economic Review* 75(3): 326–340.

⟡ Haltiwanger, John & Michael Waldman (1989), "Limited rationality and strategic complements: the implications for macroeconomics," *The Quarterly Journal of Economics* 104(3): 463–483.

Angeletos, George-Marios & Chen Lian (2018), "Forward guidance without common knowledge," *American Economic Review* 108(9): 2477–2512.

Frydman, Cary & Salvatore Nunnari (2021), "Cognitive imprecision and strategic behavior," Working paper.

Finite Horizon Optimization

⟐ Woodford, Michael (2019), "Monetary policy analysis when planning horizons are finite," *NBER Macroeconomics Annual* 33(1): 1–50.

Gust, Christopher, Edward Herbst & David Lopez-Salido (2022), "Short-Term Planning, Monetary Policy, and Macroeconomic Persistence," *American Economic Journal: Macroeconomics* 14(4): 174–209.

Woodford, Michael & Yinxi Xie (2022), "Fiscal and monetary stabilization policy at the zero lower bound: Consequences of limited foresight," *Journal of Monetary Economics* 125: 18–35.

News & Noise in Business Cycles

⟐ Barsky, Robert B & Eric R Sims (2011), "News shocks and business cycles," *Journal of Monetary Economics* 58(3): 273–289.

⟐ Barsky, Robert B & Eric R Sims (2012), "Information, animal spirits, and the meaning of innovations in consumer confidence," *American Economic Review* 102(4): 1343–77.

⟐ Chahrour, Ryan & Kyle Jurado (2018), "News or noise? The missing link," *American Economic Review* 108(7): 1702–36.

⟐ Jaimovich, Nir & Sergio Rebelo (2009), "Can news about the future drive the business cycle?" *American Economic Review* 99(4): 1097–1118.

Uncertainty Shocks

⟐ Bloom, Nicholas (2009), "The impact of uncertainty shocks," *Econometrica* 77(3): 623–685.

⟐ Fajgelbaum, Pablo, Edouard Schaal & Mathieu Taschereau-Dumouchel (2017), "Uncertainty traps," *The Quarterly Journal of Economics* 132(4): 1641–1692.

⟐ Jurado, Kyle, Sydney C Ludvigson & Serena Ng (2015), "Measuring uncertainty," *American Economic Review* 105(3): 1177–1216.

⟐ Ludvigson, Sydney C, Sai Ma & Serena Ng (2021), "Uncertainty and business cycles: exogenous impulse or endogenous response?" *American Economic Journal: Macroeconomics* 13(4): 369–410.

Baker, Scott R, Nicholas Bloom & Steven J Davis (2016), "Measuring economic policy uncertainty," *The Quarterly Journal of Economics* 131(4): 1593–1636.

Basu, Susanto & Brent Bundick (2017), "Uncertainty shocks in a model of effective demand," *Econometrica* 85(3): 937–958.

Berger, David, Ian Dew-Becker & Stefano Giglio (2020), "Uncertainty shocks as second-moment news shocks," *The Review of Economic Studies* 87(1): 40–76.

Bloom, Nicholas, Max Floetotto, Nir Jaimovich, Itay Saporta-Eksten & Stephen J Terry (2018), "Really uncertain business cycles," *Econometrica* 86(3): 1031–1065.

Sentiments in Business Cycles

⟐ Angeletos, George-Marios & Jennifer La'O (2013), "Sentiments," *Econometrica* 81(2): 739–779.

⟐ Bianchi, Francesco, Sydney C. Ludvigson & Sai Ma (2022), "Belief distortions and macroeconomic fluctuations," *American Economic Review* 112(7): 2269–2315.

⟐ Lorenzoni, Guido (2009), "A theory of demand shocks," *American Economic Review* 99(5): 2050–84.

Acharya, Sushant, Jess Benhabib & Zhen Huo (2021), "The anatomy of sentiment-driven fluctuations," *Journal of Economic Theory* 195: 105280.

Angeletos, George-Marios, Fabrice Collard & Harris Dellas (2018), "Quantifying confidence," *Econometrica* 86(5): 1689–1726.

Angeletos, George-Marios, Fabrice Collard & Harris Dellas (2020), "Business-cycle anatomy," *American Economic Review* 110(10): 3030–70.

Burnside, Craig, Martin Eichenbaum & Sergio Rebelo (2016), "Understanding booms and busts in housing markets," *Journal of Political Economy* 124(4): 1088–1147.

Welfare Considerations

Brunnermeier, Markus K, Alp Simsek & Wei Xiong (2014), "A welfare criterion for models with distorted beliefs," *The Quarterly Journal of Economics* 129(4): 1753–1797.

Hassan, Tarek A & Thomas M Mertens (2017), "The social cost of near-rational investment," *American Economic Review* 107(4): 1059–1103.